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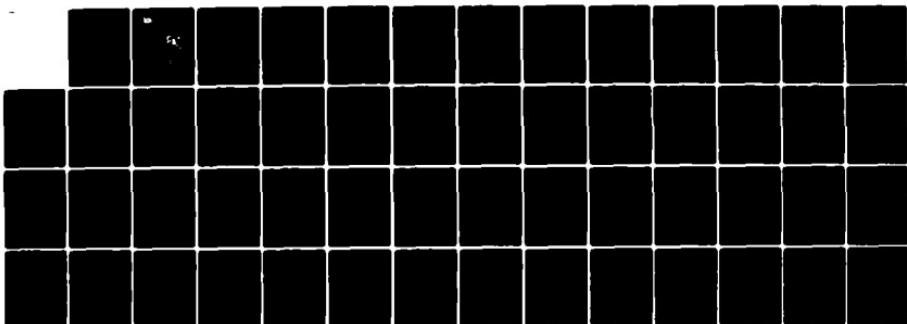
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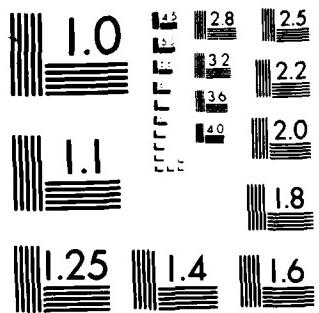
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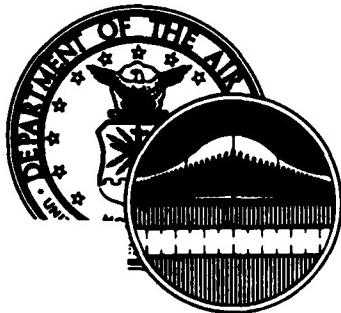
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OCCUPATIONAL SURVEY REPORT



COMPUTER SYSTEMS OFFICER UTILIZATION FIELD

AFSS 51XX

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OCCUPATIONAL ANALYSIS PROGRAM
USAF OCCUPATIONAL MEASUREMENT CENTER
AIR TRAINING COMMAND
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PREFACE

This report presents the results of a detailed Air Force Occupational Survey of the ten specialties within the Computer Systems Officer utilization field (AFSs 513XA, 513XB, 513XC, 513XD, 513XE, 515X, 516X, 511X, 517X, and SDI 0960). The project was directed by HQ ATC/TT with the support and assistance of HQ USAF/ACD for use in making decisions concerning classification, training, and personnel utilization. Authority for conducting occupational surveys is contained in AFR 35-2.

The survey instrument, USAF Job Inventory AFPT 90-51X-468, was developed by Captains W. E. Griffith and F. W. Gibson. The survey data were analyzed and the report written by Mr J. S. Tartell, with the assistance of Mrs V. Frechel. This report has been reviewed and approved by Mr P. N. DiTullio, Chief, Management Applications Section, USAF Occupational Measurement Center, Randolph AFB, Texas 78150.

The Occupational Survey Program within the Air Force has been in existence since 1956 when initial research was undertaken by the Air Force Human Resources Laboratory to develop the methodology for conducting occupational surveys. Computer programs for analyzing the occupational data were designed by Dr R. E. Cristal, Manpower and Personnel Division, AF Human Resources Laboratory, and were written by the Computer Programming Branch, Technical Services Division, AFHRL.

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**OCCUPATIONAL SURVEY REPORT
COMPUTER SYSTEMS OFFICER UTILIZATION FIELD
(AFS 51XX)**

INTRODUCTION

The Computer Systems Officer utilization field (AFS 51XX) is composed of five specialties, AFSCs 511X, 513XA/B/C/D/E, 515X, 516X, and 517X. In addition, there is a special duty identifier, 0960, for Computer Systems Program Directors. The occupational survey data were collected and analyzed to satisfy two objectives: first, to determine if the specialties are aligned to meet current and anticipated responsibilities; and second, to determine the most effective training for computer systems officers.

History and Background

The current Computer Systems utilization field was formed in 1970 through the amalgamation of the Electronic Data Processing specialty (AFSC 6854, which began in 1957), the Statistical Services Officer (AFSC 6834, formed in 1954), the Statistical Services Staff Officer (AFSC 6815; again, formed in 1954), the Mathematician, Computer Technology (AFSC 2625B originated in 1964), the Computer Systems Analyst (Special Duty Identifier 0116, established in 1968), and the Computer Systems Programming Officer (Special Duty Identifier 0124, also established in 1968). The 1970 structure of the utilization field contained five specialties: Computer Systems Staff Officer (AFSC 5116); Computer Systems Design Engineer [with three shreds - Equipment Design (AFSC 5125A), Systems Design (AFSC 5125B), and Mathematics, Techniques (AFSC 5125C)]; Computer Systems Analyst [with two shreds - Systems Software (AFSC 5135A) and Applications Software (AFSC 5135B)]; Computer Systems Programmers [with two shreds - Systems Software (AFSC 5144A) and Applications Software (AFSC 5144B)]; and Computer Systems Operations Officers (AFSC 5155).

In 1978, the specialty classification structure was modified to the present structure, as shown below:

Computer Systems Staff Officer	AFSC 5116
Computer Systems Development Officer	
Basic Software	AFSC 5135A
Applications Software	AFSC 5135B
Data Base Administration	AFSC 5135C
Computer Mathematics, Techniques	AFSC 5135D
Computer Performance Evaluation	AFSC 5135E
Computer Operations Officers	AFSC 5155
Computer Systems Plans & Programs Officers	AFSC 5164
Computer Systems Managers	AFSC 5176

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A special duty identifier of 0960 was created in 1974 as a Senior ADP Program Single Manager. In 1978, the title was changed to the present form, Computer Systems Program Director.

In the utilization field, there are three specialties which have ATC basic resident technical training associated with them. Listed below are the course titles, location, and length of these courses:

AFSC 5135 -	E30BR5131B Applications Software	Keesler	13 Weeks
AFSC 5155 -	E30BR5151 Operations	Keesler	6 Weeks, 3 Days
AFSC 5116 -	E30AR5111 Staff Officer	Keesler	5 Weeks, 2 Days

SURVEY METHODOLOGY

Development of the Survey Instrument

The survey instrument used to collect data for this occupational survey was USAF Job Inventory AFPT 90-51X-468, dated August 1982. The job inventory was developed between July 1981 and February 1982, based on interviews with 600 officers at 22 locations worldwide. The survey instrument was validated in March 1982 at a workshop of Computer Systems Officers representing the Air Staff, MAJCOMs, and separate operating agencies (SOAs). The job inventory was composed of two sections. The first was a background section which was used to gather personal information, such as name, grade, time-in-service, job interest, and programming languages used. The second section was a task list, a collection of 1,105 task statements related to all aspects of the computer systems utilization field.

Survey Population

The officers included in this survey were selected from the Uniform Officer Record file for August 1982. To be included, officers had to have been assigned to their present duty position for at least 60 days, not programmed for PCS, retirement, or discharge for at least 90 days, and possess one of the duty AFSCs listed below:

Computer Systems Staff Officer	AFSC 511X
Computer Systems Development Officer	
Basic Software (Nonfunctional)	AFSC 513XA
Applications Software (Functional)	AFSC 513XB
Data Base Administration	AFSC 513XC
Computer Mathematics, Techniques	AFSC 513XD
Computer Performance Evaluation	AFSC 513XE
Computer Operations Officer	AFSC 515X
Computer Systems Plans & Programs Officer	AFSC 516X
Computer Systems Manager	AFSC 517X
Computer Systems Program Director	SDI 0960

From a total of 3,189 Computer Systems Officers and Program Directors, 2,655 met the criteria for inclusion in the survey sample. Completed job inventories were received from 2,046 personnel for a return rate of 77 percent, representing 64 percent of the assigned strength.

Tables 1, 2, and 3 compare the characteristics of the survey sample with the population characteristics of the utilization field. In all instances, the survey sample is representative of the population and is adequate to allow for valid inferences from the data.

TABLE 1
DISTRIBUTION BY MAJOR COMMAND

	<u>PERCENT OF</u>	
	<u>ASSIGNED</u> <u>(N=3,189)</u>	<u>SAMPLE</u> <u>(N=2,046)</u>
SAC	16	19
AFSC	14	13
TAC	13	11
AFCC	13	14
ATC	9	6
MAC	5	6
USAFE	3	4
AFLC	2	2
PACAF	1	2
OTHER	24	23

TABLE 2
DISTRIBUTION BY GRADE

	<u>PERCENT OF</u>	
	<u>ASSIGNED</u> <u>(N=3,189)</u>	<u>SAMPLE</u> <u>(N=2,046)</u>
COLONEL	3	3
LIEUTENANT COLONEL	7	7
MAJOR	12	12
CAPTAIN	32	28
LIEUTENANT	46	50

TABLE 3
DISTRIBUTION BY SPECIALTY

<u>DUTY AFSC</u>	<u>PERCENT OF</u>	
	<u>ASSIGNED</u> <u>(N=3,189)</u>	<u>SAMPLE</u> <u>(N=2,046)</u>
511X	11	10
513XA	15	15
513XB	38	38
513XC	3	3
513XD	5	4
513XE	3	3
515X	5	5
516X	9	9
517X	9	9
0960	2	3

Training Emphasis Data Collection

In addition to completing the job inventory, a selected sample of Computer Systems Officers were asked to complete a second booklet containing the same tasks as the job inventory. These officers were asked to rate tasks on the training emphasis that should be placed on them, using the ten-point scale shown below.

<u>Rating Scale</u>	<u>Training Emphasis Recommended</u>
0	No structured training needed
1	Extremely low training emphasis
2	Very low training emphasis
3	Low training emphasis
4	Below average training emphasis
5	Average training emphasis
6	Above average training emphasis
7	High training emphasis
8	Very high training emphasis
9	Extremely high training emphasis

Ratings were given for those tasks which raters felt require structured training for entry-level personnel. Structured training is defined as training provided by resident technical school, field training detachments, or formal OJT. Training emphasis data were collected from 129 experienced Computer Systems Officers across the various specialties.

The training emphasis responses were separated into three sets, one for the Operations Officer training, one for Computer Systems Development Officer training, and one for Staff Officer training. The interrater reliability within each of the sets was sufficiently high to show considerable agreement among raters as to which tasks required some form of structured training.

For the tasks rated by Computer Operations Officers, the average training emphasis rating was 1.08, with those tasks having a rating of 3.4 or higher being substantially above average in training emphasis.

For the tasks rated by Systems Development Officers, the training emphasis data were aimed at the Applications Software shred. The average training emphasis rating was .71, with those tasks having a rating of 2.7 or higher being substantially above average in training emphasis.

For the tasks rated by Staff Officers, the average training emphasis rating was 1.04, with those tasks having a rating of 2.2 or higher being substantially above average in training emphasis.

When used in conjunction with other information, the training emphasis ratings can provide insight into training requirements.

Data Analysis

As the first step in the analysis of occupational survey data, each respondent's time-spent ratings were converted to percent-of-time-spent data. To accomplish this conversion, all of an individual's relative-time-spent ratings were summed, with the total representing all of the individual's job. These ratings were made by survey respondents on each of the tasks they performed in their present job, using the following time-spent scale:

<u>Rating Scale</u>	<u>Amount of Time Spent</u>
1	Very small amount
2	Much below average
3	Below average
4	Slightly below average
5	About average
6	Slightly above average
7	Above average
8	Much above average
9	Very large amount

Each separate task rating was then divided by the total, and the quotient multiplied by 100 to provide the relative-percent-time ratings for each task.

For the purpose of organizing individual jobs into similar types of work, an automated job clustering program was used. This hierarchical grouping program is a basic part of the comprehensive occupational data analysis program (CODA), developed for job analysis. Each individual job description

in the sample was compared to every other job description in terms of the relative amount of time spent on each task in the inventory. On the first iteration, the clustering program is designed to locate the two job descriptions with the most similar ratings. These two job descriptions are combined to form a composite. In successive stages, individual job descriptions of other respondents were added to the initial composite or new groups were formed based only on the similarities in tasks performed and time spent. This procedure was continued until all individuals and groups were combined to form a single composite representing the total survey sample.

The analysis of the clustering data allowed the identification of: (a) the number and characteristics of the different jobs which existed within the Computer Systems Officer utilization field; (b) the tasks which tended to be performed together by the same respondents; and (c) task and incumbent characteristics which may be peculiar to specific functional requirements as they existed at the time of the survey.

JOB STRUCTURE ANALYSIS

Overview

For the Computer Systems Officer utilization field, 2,046 individual job descriptions were compared to identify the field structure of jobs. The analysis identified five large clusters of jobs and nine smaller job groups. Table 4 lists the clusters and other job groups, with the number of officers and percentages of the total sample those officers represent in each. Table 5 shows the percentage of job time expended by members of each job cluster or group performing tasks in each of the job inventory duties.

The immediate impression gathered from the information to this point is the existence of a wide variety of jobs, with the diversity of jobs not necessarily matched to the existing utilization field structure. As further evidence of this latter point, Table 6 presents the duty AFSCs of respondents within each of the jobs identified by the structure analysis. More on this point will be covered below in the discussion of each job cluster or group.

A further indicator of the variability of jobs performed by Computer Systems Officers is the number and type of tasks performed by a substantial percentage of all the survey respondents. There was no task performed by as many as 75 percent of the total sample and only six tasks performed by more than half of the total sample. The six tasks are as follows:

- Draft or write general correspondence
- Prepare formal or informal briefings
- Present formal or informal briefings
- Travel outside local area on official business or TDY
- Edit or proofread general correspondence
- Draft or write reports required by additional duties

The applicability of these tasks to virtually any job is obvious.

Job Group Descriptions

This section of the analytical narrative provides details about each of the job groups identified during the structural analysis. In most instances, the information will be limited to a brief description of the respondents who comprise the job and some of the tasks which will illustrate the nature of the job. For the clusters, a brief outline of the jobs that were grouped together to form the cluster will also be provided. The order in which the jobs will be presented is a result of the hierarchical clustering analysis program and the only importance that can be attached to that ordering was that the job inventory with the lowest case control number, 0001, happened to be completed by an individual performing a management job.

TABLE 4
JOBS IDENTIFIED BY STRUCTURE ANALYSIS

	<u>NUMBER OF RESPONDENTS</u>	<u>PERCENT OF SAMPLE</u>
MANAGEMENT	408	20
ACQUISITION & CONTRACTING	300	15
MAINTENANCE MONITORS	20	1
PERFORMANCE EVALUATORS	21	1
FACILITIES MONITORS	16	1
TEST & EVALUATION OFFICERS	45	2
SOFTWARE CONFIGURATION CONTROLLERS	38	2
TELECOMMUNICATIONS SOFTWARE MONITORS	22	1
CONTRACT EVALUATORS	64	3
SECURITY MANAGERS	43	1
STAFF OFFICERS	113	6
SYSTEMS ANALYSTS	803	39
DATA BASE ADMINISTRATORS	20	1
TRAINING	64	3

TABLE 5
TIME SPENT PERFORMING TASKS WITHIN DUTIES BY RESPONDENTS IN EACH JOB GROUP

DUTIES	MGT	ACON AND CONTR	MAINT MONITORS	PERFORM-ANCE EVAL	FCLTIS MONITORS	TEST AND EVAL OFCRS	SOFTWARE CONFIG CNTRL	TELECOM SOFTWARE MONITORS	CONTR EVAL	SCTY MGRS	STAFF OFCR	SYS ANALY	PERCENT TIME SPENT		
													DATA BASE	ADMIN	TNG
COMMAND AND MANAGEMENT	25	7	9	8	7	8	11	4	4	4	12	12	5	7	9
PERSONNEL AND RESOURCE MGT	16	8	7	4	8	3	4	4	4	3	2	4	4	1	2
INSPECTING	4	1	2	1	3	*	2	*	1	1	6	2	1	*	1
TRAINING	3	1	3	3	*	2	2	1	1	1	4	6	2	3	53
ADMINISTRATION	1	1	2	2	1	1	3	1	2	3	2	1	3	1	1
EQ CONT AND FAC MGT	5	4	19	3	31	1	1	6	2	1	3	1	*	*	*
ACQ AND CONTRACTING	4	19	14	2	5	5	4	10	40	2	6	1	1	*	*
SECURITY	4	3	1	2	3	2	3	5	3	41	3	4	5	1	1
MOBILITY AND EXERCISE	2	1	1	*	2	1	*	*	*	1	2	*	2	1	1
PROG AND PROJ MGT	4	10	2	4	6	3	3	5	4	1	5	2	2	*	*
REQUIREMENTS	5	12	5	7	4	2	5	11	6	1	6	5	7	1	1
DATA BASE MANAGEMENT	1	1	1	2	1	1	2	1	1	1	1	1	5	37	1
SOFTWARE DEVELOPMENT	4	6	10	14	2	8	18	11	6	4	6	48	11	15	
SYSTEMS ENGINEERING	1	4	1	7	2	2	2	4	3	*	2	2	1	1	
TESTING AND EVALUATION	1	3	1	17	1	1	41	10	3	5	1	1	4	1	1
CONFIG MGT AND QA	2	5	1	1	1	4	17	2	5	2	2	3	1	*	*
OPERATIONS	4	2	8	5	3	2	3	4	1	3	2	7	3	3	
TELECOMMUNICATIONS	1	1	2	1	3	2	*	11	1	*	1	1	*	1	

*LESS THAN ONE PERCENT

TABLE 6
DUTY AFSCs OF SURVEY RESPONDENTS IN EACH JOB GROUP

JOB GROUP	PERCENT OF EACH JOB GROUP									
	DAFSC <u>511X</u>	DAFSC <u>513XA</u>	DAFSC <u>513KB</u>	DAFSC <u>513XC</u>	DAFSC <u>513XD</u>	DAFSC <u>513XE</u>	DAFSC <u>515X</u>	DAFSC <u>516X</u>	DAFSC <u>517X</u>	SDI <u>0960</u>
MANAGEMENT	22	3	7	*	-	*	17	7	28	13
ACQUISITION & CONTRACTING	18	13	24	-	31	2	*	28	7	2
Maintenance Monitors	5	40	30	-	-	-	5	15	-	-
Performance Evaluators	14	14	14	5	5	43	-	5	-	-
Facilities Monitors	25	6	19	-	-	-	6	37	-	-
Test & Evaluation Officers	9	7	60	-	-	7	-	2	9	-
Software Configuration Controllers	6	8	34	8	3	5	-	13	21	-
Telecommunications Software Monitors	5	23	32	9	-	5	-	14	-	-
Contract Evaluators	5	25	48	-	1	4	-	11	2	2
Security Managers	12	12	33	7	-	-	12	16	5	-
Staff Officers	18	13	31	1	4	5	4	20	4	-
Systems Analysts	2	22	58	4	8	2	1	-	2	-
Data Base Administration	-	5	45	30	5	5	5	-	-	-
Training	6	14	55	9	3	3	3	2	3	-

*LESS THAN ONE PERCENT

MANAGEMENT (GPO101). The Management cluster is an aggregation of 13 jobs which represent 20 percent of the survey sample. The jobs which form the Management cluster were:

Directors
Chiefs of Data Automation Divisions
Plans Managers
Software Requirement Managers
Training Managers
Contracting Managers
Division Chiefs
Executive Officers
Acquisition Strategy Managers
E&A Team Chiefs
Budget Managers
Requirements Managers
Personnel Managers

Most officers in the Management cluster had the senior level duty AFSCs (28 percent held DAFSC 5176, 22 percent held DAFSC 5116, and 13 percent held SDI 0960). An additional 17 percent held DAFSC 5155, with most of these respondents performing as Data Automation Division Chiefs. Viewing the duty AFSCs from a different perspective, the Management cluster included 95 percent of all of the SDI 0960 respondents in the total sample, 76 percent of all DAFSC 5155 respondents, 67 percent of all DAFSC 5176 respondents, and 46 percent of all DAFSC 5116 respondents.

Personnel in the Management cluster performed an average of 135 tasks, and were assigned in all major commands and special activities, with the majority assigned at MAJCOM or higher organizational levels. Review of the indicators of job satisfaction placed respondents in the management cluster higher than average for job interest, sense of accomplishment gained from work, and utilization of training.

As shown in Table 5, respondents in the Management cluster spent a substantial proportion of their job time performing tasks related to command, supervision, personnel actions, and resource management. The tasks listed below illustrate the type of job performed by personnel in the Management cluster:

Assign personnel to duty positions or additional duties
Establish organizational policies, office instructions, or standing operating procedures
Interpret policies, directives, or procedures for subordinates
Plan or direct work assignments or workloads
Endorse or review airman performance reports (APRs)
Draft or write officer effectiveness reports (OERs)

ACQUISITION AND CONTRACTING (GPO099). The Acquisition and Contracting cluster is an amalgamation of 10 jobs which represent 15 percent of the survey sample. The jobs which form this cluster include:

Contract Monitors
Weapons System Requirements Analysts
Software Requirements Analysts
Systems Support Officers
Software Systems Analysts
Requirements Analysts
MAJCOM Acquisition Monitors
Requirements Branch Chiefs
Plans and Programs Officers
Contract Project Managers

Personnel in the Acquisition and Contracting cluster held a variety of duty AFSCs (28 percent with DAFSC 5176, 24 percent with DAFSC 5135B, and 18 percent with DAFSC 5116). The majority of these personnel were company grade officers (37 percent were captains and 34 percent were lieutenants). Review of the background information for these respondents indicated: they perform an average of 150 tasks (the largest number of any job group identified in this analysis); most have undergraduate degrees in computer science (40 percent), mathematics (37 percent), or business (20 percent); and they were assigned to all major commands and special activities.

The information in Table 5 shows these officers used a substantial proportion of their job time performing tasks related to Acquisitioning and Contracting, Requirements, and Program and Project Management. The tasks listed below illustrate the types of jobs performed by these respondents:

Determine computer software requirements
Determine computer hardware requirements
Evaluate vendor or contractor proposals
Develop strategies for implementation of new projects,
proposals, or systems
Forecast future ADP requirements

An issue for personnel in this cluster is how to obtain the knowledges necessary to perform the acquisition and contracting functions of their jobs. Less than 20 percent of these officers attended the Computer Systems Development Officer course (3OBR5131B) or the Computer Systems Staff Officer course (3OAR5111) and only 11 percent received formal OJT at their first Computer Officer assignment. Given the attendance at the courses listed, the former contains no information on acquisition or contract management and the latter contains 11.5 hours dedicated to acquisition. [The area of contracting and acquisition training will be addressed further in the Training Assessment Section of this report.]

MAINTENANCE MONITORS (GPO121). This small job group represented one percent of the survey sample. The majority (70 percent) of incumbents held duty AFSC 5135 with an A- or B-shred. These officers performed an average of 124 tasks, were assigned to a variety of major commands, and generally were satisfied with their jobs. The respondents in this group expended a substantial proportion of their job time performing tasks related to equipment control and facilities management. The tasks listed below illustrate the job performed by the Maintenance Monitors:

- Coordinate with vendors or contractors on maintenance support of ADPE
- Certify completion of ADPE maintenance
- Schedule ADPE maintenance from vendors or contractors
- Certify completion of ADPE installation
- Inventory ADPE

PERFORMANCE EVALUATORS (GPO164). The small job group of Performance Evaluators represented one percent of the survey sample. Most held the Systems Development AFSC, with 43 percent of the incumbents possessing the Performance Evaluation shred (E-shred). These respondents performed an average of 98 tasks, with the largest concentration of group members assigned to AFCC (38 percent). Officers in this group reported the lowest level of sense of accomplishment from their jobs of any group in the survey sample, with only 47 percent reporting being satisfied.

Personnel in the Performance Evaluators job group spent a substantial proportion of their job time performing Systems Testing and Evaluation tasks, with the tasks listed below illustrating the type of job performed:

- Conduct computer performance monitoring or computer performance evaluations
- Prepare CPE or CPM performance analyses
- Draft or write CPE or CPM performance reports or analyses
- Analyze system performance parameters, such as channel busy abnormalities, CPU busy, or disk read rates
- Evaluate CPE or CPM plans

FACILITIES MONITORS (GPO159). Members of the Facilities Monitors job group accounted for one percent of the survey sample and performed an average of 79 tasks. Officers in this group were generally assigned at the major command level and the majority held duty AFSC 5164 (37 percent) or 5116 (25 percent). Members of this job group reported the lowest level of utilization of training, with 56 percent indicating utilization of training as very little or not at all.

Individuals in the Facilities Monitors job group used approximately one-third of their job time performing tasks related to Equipment Control and Facilities Management. The tasks listed below illustrate the type of job performed:

- Determine environmental system support requirements,
such as power or air conditioning
- Review facilities modification plans
- Evaluate facility designs or architectural blueprints
- Perform pre-installation inspections of facilities
- Participate in facilities predesign conferences

TEST AND EVALUATION OFFICERS (GPO093). The survey respondents in the Test and Evaluation job group represented two percent of the survey sample. Most (60 percent) had the Applications Software shred (B-shred) of the Systems Development specialty (AFSC 5135). Group members performed an average of 91 tasks, with tasks from the Systems Testing and Evaluation duty accounting for 41 percent of their job time. Individuals in this group reported the lowest level of job interest of any in the sample, with 66 percent finding their job interesting. Officers in this group were assigned to most major commands, with TAC accounting for 38 percent. The tasks listed below reflect the job performed by the Test and Evaluation Specialists:

- Develop test procedures
- Develop test plans
- Evaluate test plans or procedures
- Prepare test objectives
- Draft or write test analysis reports

SOFTWARE CONFIGURATION CONTROLLERS (GPO123). This small job group represented two percent of the survey sample. The majority of incumbents held the System Development AFSC (58 percent), with 34 percent having the Applications Software or B-shred. These personnel performed an average of 130 tasks, were assigned to a variety of major commands (with 40 percent in SAC), and generally found their jobs interesting. The survey respondents in this group indicated a relatively low level of utilization of training in their jobs with 55 percent indicating their training was utilized very little or not at all.

Officers in the Software Configuration Controller job spent a substantial proportion of their job time (35 percent) performing tasks from the Software Development and Configuration Management and Quality Assurance duties. Tasks illustrative of the type of job performed are as follows:

- Participate in configuration control boards (CCB)
- Coordinate with users on new systems releases
- Track status of software discrepancies
- Ensure programs or documentation comply with standards
- Monitor baseline releases of software

TELECOMMUNICATIONS SOFTWARE MONITORS (GPO044). Respondents in this job group accounted for one percent of the survey sample. Most of the incumbents held the Software Development specialty with the Basic Software or Applications Software shred (23 percent, Basic Software or A-shred and 32 percent, Applications Software or B-shred). These individuals performed 64 tasks on the average and were assigned to a variety of commands and special activities, generally at the major command level. The members of this job group were among the most junior of all of the job groups, 77 percent were lieutenants, with the remainder being captains. A review of incumbents' education indicated that within this small job group, 86 percent possessed undergraduate degrees in computer science, the highest concentration for any job group. Additionally, less than 10 percent had attended any technical training courses and 41 percent reported receiving no OJT for their present job.

The tasks which accounted for a substantial proportion of the job time of these officers covered a number of duties, including Telecommunications, Requirements, Software Development, and Acquisition and Contracting. The tasks listed below capture the type of job performed:

- Monitor progress of DARs, PARs, SONs, SDNs, or change proposals or requests
- Analyze systems communications requirements
- Coordinate with field engineers or communications personnel on resolution of telecommunications problems
- Forecast communications requirements
- Prepare sole source or sole brand justifications

CONTRACT EVALUATORS (GPO039). The Contract Evaluators job group represents three percent of the survey sample, with the majority of incumbents (73 percent) holding the Applications Software (B-shred) or Basic Software (A-shred) shreds to the Systems Development specialty. Personnel in this job group performed an average of 57 tasks and most were assigned to either TAC (55 percent) or AFCC (20 percent). Incumbents reported generally high job interest but relatively low utilization of training, with 52 percent reporting training utilized very little or not at all.

Tasks from the Acquisition and Contracting duty accounted for 40 percent of the job time for these respondents. The tasks listed below are indicative of the jobs performed:

- Evaluate contractor compliance with contract terms
- Evaluate contract deliverables
- Conduct technical evaluations of vendor or contractor proposals
- Coordinate with contractor to resolve discrepancies identified in reviews or audits
- Evaluate contractor compliance with test procedures or test plans

SECURITY MANAGERS (GPO041). Incumbents in the Security Managers job group represent one percent of the survey sample. Most respondents held DAFSCs of 5135B (33 percent), 5164 (16 percent), and 5155, 5135A, and 5116 (12 percent each). These personnel performed an average of 72 tasks, were assigned to all major commands and special activities, and were reasonably satisfied with their jobs. Tasks from the Security duty accounted for 41 percent of their duty time with the tasks listed below illustrating the functions performed:

- Develop or revise ADP security programs, procedures, or checklists
- Implement security plans, procedures, or programs
- Conduct security inspections
- Evaluate security plans, procedures, or programs
- Draft or write inputs to regulations, directives, or manuals

STAFF OFFICER (GPO033). The Staff Officer job cluster includes six percent of survey respondents, whose work may be divided into three smaller jobs: (1) the general staff officer; (2) information systems staff officers; and (3) training staff officers. Incumbents in this large Staff Officer cluster included personnel from all grades and all specialties. These respondents performed an average of 36 tasks, the smallest number for any job group or cluster. Personnel in this cluster were assigned to all major commands and special activities and at all organizational levels. (A point to note is that 13 percent of all DAFSC 5164 respondents, 12 percent of all DAFSC 5135E respondents, and 10 percent of all DAFSC 5116 respondents were in this cluster.) Officers in this cluster reported job satisfaction indicators about average for all survey respondents.

Tasks from the General Functions and the Command and Management duties accounted for the greatest proportion of the Staff Officer job time (48 percent). The tasks listed below are illustrative of the jobs performed:

- Coordinate on externally originated actions, papers, or reports
- Advise commanders or functional area personnel on data automation issues or policies
- Draft or write responses to inquiries from governmental or outside agencies
- Develop work methods or procedures
- Escort dignitaries, VIPs, or visitors

SYSTEMS ANALYSTS (GPO043). The Systems Analysts job cluster, the largest cluster reported in this survey, represents 39 percent of the total sample. Incumbents held all of the Systems Development (AFSC 5135) specialty shreds, with the majority holding the Applications Software (B) or Basic Software (A) shreds (58 percent and 22 percent, respectively). In

reviewing the total number of respondents in each shred of the Systems Development ladder, the majority of respondents in shreds A, B, C, and D were found in this cluster: A-shred, 62 percent; B-shred, 64 percent; C-shred, 66 percent; D-shred, 88 percent. Included in this cluster were ten jobs, listed below, all of which tended to include many of the same tasks.

- Software Security Monitors
- Operations Analysts
- Software Development Specialists
- Applications Analysts
- Requirements Analysts
- Data Base Analysts
- Software Development Section Chiefs
- Software Maintainers
- Design Analysts
- Entry-level Analysts

Across all of these jobs, the Applications Software shred (B-shred) specialty predominates, with one exception. The Software Development Specialists job group, which included four percent of the cluster, has a higher proportion (76 percent) of Basic Software (A-shred) personnel. Additionally, within the two larger jobs, Operations Analyst and Applications Analyst, there were areas of specialization, such as systems development to support scientific applications, modeling applications, warning systems applications, target and radar applications, testing applications, communications applications, and data base management applications. However, the support provided each of these types of applications by Computer Officers involved performing many of the same tasks, such as the ones below:

- Debug programs
- Compile or assemble programs
- Determine causes of program aborts
- Define functions to be performed by individual programs or modules
- Analyze user software requirements

The officers in the Systems Analyst cluster performed an average of 107 tasks, were assigned to all major commands and special activities (29 percent were assigned to SAC), and generally reported high levels of job satisfaction. These respondents indicated the highest level of utilization of training, with 83 percent reporting their training was utilized fairly well or better.

Reviewing the programming languages used by Systems Analysts revealed nine languages (from the list of 72 listed in the survey booklet) were used by at least 10 percent of the cluster incumbents. These languages are listed below with the percentage of cluster respondents who use each in their present job.

<u>LANGUAGE</u>	PERCENT OF SYSTEMS ANALYSTS CLUSTER USING THE LANGUAGE
FORTRAN	57 percent
COBOL	50 percent
Assembler	39 percent
JCL	33 percent
Basic	18 percent
GMAP	16 percent
JOVIAL	14 percent
PL1	12 percent
TSO Command	12 percent

Within the cluster, there were some languages used more by the officers in the smaller job groups listed earlier. Examples of the users of programming languages, in addition to the ones listed above, are as follows:

Operations Analysts	PDL	18 percent
	BAL	12 percent
Software Development Specialists	BAL	27 percent
	ALC	15 percent
	ALGOL	12 percent
	ASM	12 percent
Requirements Analysts	ALC	22 percent
	PASCAL	22 percent
	ASM	12 percent
	BAL	12 percent
	ADMS	12 percent
	GASP	11 percent
	SPSS	11 percent

The Systems Analysts cluster appears to represent a core job for personnel in the Systems Development specialty. The cluster includes the largest percentage of personnel with a DAFSC 5135 and includes 57 percent of all lieutenants who completed the survey. This was the largest single composite of junior grade respondents.

DATA BASE ADMINISTRATORS (GPO062). Incumbents in this small job group represent one percent of the survey sample. These respondents held the Systems Development (AFSC 5135) specialty, with 45 percent possessing the Applications Software shred (B-shred) and 30 percent holding the Data Base Administration shred (C-shred). These officers performed an average of 54 tasks, with the majority assigned to special activities (45 percent) and SAC (25 percent). Respondents in this job group reported high levels of job satisfaction; 95 percent found their jobs interesting and 85 percent were satisfied with the sense of accomplishment gained from their work.

The officers in this group spent the greatest proportion (37 percent) of their job time performing tasks from the Data Base Management duty. The tasks listed below illustrate the job performed:

- Advise users of available data bases
- Determine data base currency or accuracy
- Ensure integrity of data bases between version changes
- Determine data base requirements
- Identify problems with data storage or retrieval systems

TRAINING (GPO045). The Training cluster represents three percent of the sample and includes the four small job groups listed below:

- General Technical Training Instructors
- Software Instruction Specialists
- Computer Science Professors
- WWMCCS MTT Instructors

Incumbents hold all specialties (55 percent hold DAFSC 5135B), perform an average of 59 tasks, and the majority were assigned to either ATC or USAFA. These individuals indicated relatively high levels of job satisfaction.

Members of the Training cluster used the majority of their job time performing training tasks, as illustrated below:

- Conduct formal or resident course classroom training
- Draft or write lesson plans
- Evaluate student progress
- Administer or score tests
- Counsel students on education or training progress

Summary of the Job Structure Analysis

Determination of the structure of the Computer Systems Officers (AFS 51XX) utilization field, based on tasks performed, showed five job clusters and nine smaller job groups. Among these 14 different jobs, three clusters accounted for 74 percent of the survey sample. These three clusters (Management; Acquisition and Contracting; and Systems Analysts) included the majority of the survey respondents in each of the five specialties and the five shreds to the Systems Development AFSC (5135A/B/C/D/E).

Within each of these three large clusters, a number of jobs were identified. Across these many jobs, however, the data indicate only one was specific to an existing AFSC. That was the job of Data Automation Division Chief performed primarily by personnel holding the duty AFSC 5155 (69 percent of the job group members). Across the remaining four clusters and

nine job groups, there was no single job group composed of officers with a single AFSC. These findings seem to show a possible need for close reexamination of the present classification structure.

In any attempt to restructure the present specialty configuration, consideration of how Computer Systems Officers are actually utilized should be the paramount issue. For the Computer Systems Officer utilization field, an efficient and effective classification structure would revolve around the existing job structure. There is little likelihood that the current job structure of the field will change dramatically in the near future. The data seem to show a new structure built around specialties for operations and systems analysis for company grade officers graduated to specialties for acquisition, contracting, and management for more senior officers would be in line with actual jobs performed by Computer Systems Officers. The smaller jobs could be accommodated by specialized training once a progression pattern was established.

TABLE 7
AVERAGE NUMBER OF TASKS PERFORMED
BY MEMBERS OF EACH JOB GROUP

<u>JOB GROUP</u>	<u>AVERAGE NUMBER OF TASKS PERFORMED</u>
MANAGEMENT	135
ACQUISITION & CONTRACTING	150
MAINTENANCE MONITORS	124
PERFORMANCE EVALUATORS	98
FACILITIES MONITORS	79
TEST & EVALUATION OFFICERS	91
SOFTWARE CONFIGURATION CONTROLLERS	130
TELECOMMUNICATIONS SOFTWARE MONITORS	64
CONTRACT EVALUATORS	57
SECURITY MANAGERS	72
STAFF OFFICERS	36
SYSTEMS ANALYSTS	107
DATA BASE ADMINISTRATORS	54
TRAINING	59

TABLE 8
MAJCOM DISTRIBUTION FOR JOB GROUP MEMBERS

JOB GROUP	PERCENT RESPONDING									
	SAC	AFSC	TAC	AFCC	ATC	MAC	USAFC	AFLC	PACAF	OTHER
MANAGEMENT	15	9	10	12	6	7	9	3	3	26
ACQUISITION & CONTRACTING	10	24	10	13	4	3	4	4	4	26
Maintenance Monitors	5	30	10	20	5	-	5	-	-	25
Performance Evaluators	19	10	5	38	-	19	-	-	5	4
Facilities Monitors	6	13	19	6	6	19	13	-	-	18
Test & Evaluation Officers	7	7	38	4	2	-	2	-	-	40
Software Configuration Controllers	40	3	18	5	-	-	13	3	4	13
Telecommunications Software Monitors	14	14	9	18	14	-	-	5	5	26
Contract Evaluators	3	55	2	20	-	-	3	-	-	17
Security Managers	12	9	16	16	2	14	2	2	5	22
Staff Officers	11	18	14	16	6	3	4	4	3	21
Systems Analysts	29	8	11	14	4	7	3	1	1	22
Data Base Administrators	25	5	5	10	-	-	5	-	5	45
Training	3	-	3	-	59	-	5	-	-	30

TABLE 9

INDICATORS OF JOB SATISFACTION AMONG JOB GROUP MEMBERS

JOB GROUP	PERCENT RESPONDING				SENSE OF ACCOMPLISHMENT*	
	JOB INTEREST*		UTILIZATION OF TRAINING		SATISFIED	NOT SATISFIED
	INTERESTING	DULL	WELL	NOT WELL		
MANAGEMENT	88	7	81	19	82	14
ACQUISITION & CONTRACTING	87	7	68	32	76	19
Maintenance Monitors	80	-	60	40	85	15
Performance Evaluators	75	14	67	33	47	48
Facilities Monitors	88	6	44	56	87	13
Test & Evaluation Officers	66	16	51	49	66	33
Software Configuration Controllers	75	9	45	55	66	24
Telecommunications Software Monitors	77	9	64	36	67	23
Contract Evaluators	74	11	48	52	68	24
Security Managers	73	11	63	37	63	30
Staff Officers	72	17	54	46	62	34
Systems Analysts	86	6	83	17	80	15
Data Base Administrators	95	-	80	20	85	10
Training	75	14	77	23	62	28

*NEUTRAL CATEGORY DELETED

TABLE 10
DISTRIBUTION OF UNDERGRADUATE DEGREES AMONG JOB GROUP MEMBERS*

JOB GROUP	COMP							PERCENT RESPONDING		
	BUS	SCI	ECON	EDUC	ENGR	HIST	MATH	MIL SCI	PHYS	
MANAGEMENT	32	14	5	8	6	5	33	7	6	
ACQUISITION & CONTRACTING	20	40	3	4	10	3	37	5	6	
MAINTENANCE MONITORS	25	45	5	5	-	15	20	5	5	
PERFORMANCE EVALUATORS	14	33	5	-	-	-	38	-	5	
FACILITIES MONITORS	38	50	6	-	19	-	6	-	0	
TEST & EVALUATION OFFICERS	29	40	4	4	4	-	38	2	0	
SOFTWARE CONFIGURATION CONTROLLERS	29	34	-	6	5	-	34	8	5	
TELECOMMUNICATIONS SOFTWARE MONITORS	27	86	-	-	5	-	14	9	5	
CONTRACT EVALUATORS	20	42	2	-	9	-	33	2	3	
SECURITY MANAGERS	47	26	7	5	-	7	16	-	2	
STAFF OFFICERS	27	33	4	4	7	3	31	2	4	
SYSTEMS ANALYSTS	22	56	4	3	6	3	24	3	3	
DATA BASE ADMINISTRATORS	30	55	-	-	5	5	10	5	5	
TRAINING	20	52	3	6	9	2	42	5	2	

*ROWS MAY ADD TO MORE THAN 100 PERCENT DUE TO MULTIPLE COMP SCI UNDERGRADUATE MAJORS

TABLE 11
DISTRIBUTION OF ORGANIZATIONAL LEVEL OF ASSIGNMENT AMONG JOB GROUP MEMBERS

JOB GROUP	DET/ FLT	SQ	GROUP	WG	AIR DIV	#AF	MAJCOM	JT	PERCENT RESPONDING		
									AIR DIV	DOD/ HQ	OTHER
MANAGEMENT	3	7	4	10	3	7	38	12	11	11	6
ACQUISITION & CONTRACTING	4	4	4	3	6	12	39	10	15	-	3
Maintenance Monitors	5	10	-	15	5	15	30	-	5	15	-
Performance Evaluators	4	-	-	-	10	4	67	4	10	4	-
Facilities Monitors	-	-	-	6	6	13	50	6	19	6	-
Test & Evaluation Officers	13	7	2	9	-	2	42	13	7	4	-
Software Configuration Controllers	8	18	5	8	-	5	34	21	-	-	-
Telecommunications Software Monitors	9	5	-	14	-	5	50	9	5	3	-
Contract Evaluators	13	14	6	8	8	11	17	9	3	11	-
Security Managers	7	12	2	9	-	-	40	16	9	5	-
Staff Officers	5	5	2	7	3	4	35	11	14	12	-
Systems Analysts	8	10	3	5	4	3	40	7	17	4	-
Data Base Administrators	5	-	10	-	-	5	45	25	10	-	-
Training	6	22	41	-	3	-	25	-	2	2	-

SPECIALTY ANALYSES

The purpose of this section is to describe the tasks performed by officers based on the existing classification structure. In addition, background information on officers in the different specialties will be reported and a comparison of the duties and responsibilities from AFR 36-1 to the tasks personnel perform will be presented.

Computer Operations Officer - AFSC 5155. The survey sample included 91 respondents with the Computer Operations Officer AFSC. The majority of these respondents were company grade officers (48 percent were lieutenants and 37 percent were captains). They were assigned to all major commands and special activities, had an average of 20 months in their present job, and an average of 12 years total service time. The Operations Officers performed an average of 161 tasks, directly supervised four people, and indirectly managed an average of 27 personnel. Most of these respondents held undergraduate degrees in the areas of business (50 percent), computer science (22 percent), or mathematics (15 percent). Approximately 30 percent had graduate degrees, the majority specializing in business (22 percent). When asked what undergraduate major would be most beneficial in the performance of their jobs, most selected computer science or business. From the computer systems courses listed in the job inventory, the Computer Operations Officer course, E30BR5151, had been attended by 42 percent of these respondents.

In reviewing the computer-generated job description for Computer Operations Officers, they spent the largest percentage of their job time performing command, personnel, and resource management functions. The tasks listed below are examples of the tasks typically performed by Computer Operations Officers:

- Establish organizational policies, office instructions or standing operating procedures
- Indorse or review Airman Performance Reports (APR)
- Conduct unit self-inspections
- Respond to customer inquiries
- Draft or write Airman Performance Reports (APR)

Comparison of the total computer-generated job description to the AFR 36-1 summary of duties and responsibilities revealed some inconsistencies. The emphasis in the specialty description is on highly technical computer operations management. The emphasis of the tasks performed by survey respondents was more management and supervision of people who accomplish highly technical data processing and manipulation functions. For all of the functions listed in the specialty description, there were tasks performed by some percentage of survey respondents. But the way the specialty description reads implies doing rather than directing, supervising, or managing. The tasks performed by substantial percentages of Computer Operations Officers reflect technical management and supervisory jobs.

Computer Systems Development Officer - AFSC 5135A/B/C/D/E. More than one-half of all survey respondents (57 percent) held one of the five Systems Development specialty shredouts, with the breakout listed below:

Basic Software (Nonfunctional) - A-shred - 282
respondents (14 percent)
Applications Software (Functional) - B-shred - 730
respondents (36 percent)
Data Base Administration - C-shred - 49
respondents (2 percent)
Computer Mathematics Techniques - D-shred - 73
respondents (3 percent)
Computer Performance Evaluation - E-shred - 45
respondents (2 percent)

Before reviewing the survey responses for officers from each of the specialty shredouts, an important point should be kept in mind. Across the five shredouts, Computer Systems Development Officers spend a substantial percentage of their job time performing many of the same tasks. Listed below are five software development tasks performed by at least 55 percent of the AFSC 5135 officers, irrespective of shredout:

- Debug programs
- Operate terminals other than word processors
- Compile or assemble programs
- Determine causes of program aborts
- Desk-check programs

a. Computer Systems Development Officers, Basic Software (Nonfunctional) - AFSC 5135A. There were 282 A-shred respondents in the survey sample. The majority (96 percent) were company grade officers assigned to AFCC (21 percent), SAC (18 percent), AFSC (17 percent), or TAC (11 percent). These respondents had an average of 20 months in their present jobs and eight and one-half years total service time. These respondents performed an average of 105 tasks. The majority had undergraduate degrees with major areas of study in computer science (59 percent), mathematics (27 percent), or business (18 percent). Slightly less than half (48 percent) had completed graduate programs with major areas of study in computer science (17 percent), business (eight percent), or mathematics (two percent). From the computer systems courses listed in the job inventory, the Computer Systems Development Officer course, E30BR5131B, had been completed by 20 percent of the A-shred respondents.

Review of the computer-generated job description for personnel with a duty AFSC of 5135A indicated incumbents expended the largest amount of their job time (32 percent) performing Software Development tasks. Personnel with the A-shred tended to perform a variety of jobs, as shown by the fact there were no tasks performed by two-thirds of these respondents. Listed below are tasks which most clearly differentiate A-shred respondents from other survey respondents:

Analyze program dumps
Write code for systems programs, such as machine or assembly language
Install or implement software
Provide on-call support for analysis of software problems
Analyze system dumps

Examination of A-shred personnel responses to the programming languages used question in the survey booklet indicated a rather broad spectrum of usage as listed below (only those languages used by more than ten percent of the A-shred officers surveyed):

FORTRAN - 45%
Assembler - 40%
COBOL - 32%
JCL - 26%
Basic - 18%
GMAP - 16%
PL1 - 14%

A comparison of task performance data for A-shred officers with the AFR 36-1 specialty description indicated a high level of agreement between the two. There were only minor differences found between the tasks performed by A-shred officers and AFR 36-1 when compared to responses from officers in other shredouts. [More discussion of this area will be presented after the other shredouts are individually examined.]

b. Computer Systems Development Officers, Applications Software (Functional) - AFSC 5135B. There were 730 respondents with the B-shred in the sample. The majority (97 percent) were company grade officers who were assigned to all major commands and special activities. The largest concentrations were in SAC (23 percent), AFSC (16 percent), and TAC (13 percent). These officers averaged 19 months in their present jobs and 86 months total service time. Review of their undergraduate areas of specialization showed majors in computer science (53 percent), business (25 percent), and mathematics (24 percent). An additional nine percent indicated having graduate degrees in computer science. From the computer systems courses listed in the job inventory, the Computer Systems Development Officer course, E30BR5131B, had been completed by 29 percent of the B-shred respondents.

A review of the computer-generated job description for B-shred officers showed 35 percent of their job time was spent performing Software Development tasks. As with the A-shred officers, those with the B-shred performed a variety of jobs and tasks. There was only one task (Debug programs) performed by more than two-thirds of the B-shred respondents. The tasks listed below are those which differentiate B-shred respondents from other Systems Development Officers:

Draft or write software documentation, such as maintenance,
user, or operations manuals
Write code for batch environments
Assist users in interpreting output or products
Participate in design analyses, project team meetings, or
internal design review meetings
Develop symbolic logic, such as logic diagrams, flow charts
or HIPO charts

Responses of B-shred personnel to the programming languages used question indicated a broad range of utilization as listed below (only those languages selected by more than ten percent of the B-shred sample are listed):

COBOL - 39%
FORTRAN - 39%
Assembler - 26%
JCL - 26%
Basic - 15%
PL1 - 15%
JOVIAL - 12%

Survey responses for B-shred personnel, when compared to the AFR 36-1 specialty description, showed general agreement, with the exception that tasks performed and languages used were applicable to a broader area (jobs and tasks designated for the other shreds) than that described by the AFR 36-1 classification summary.

c. Computer Systems Development Officer, Data Base Administration - AFSC 5135C. There were 49 respondents to the survey with the C-shred. The majority (92 percent) were company grade officers who were assigned to a variety of major commands, with the major aggregations in SAC (31 percent), ATC (16 percent), AFCC, and USAFA (eight percent each). These officers had an average of 22 months in their present jobs and slightly more than eight years total service time. Review of the educational backgrounds of C-shred officers showed the majority had majors in computer science (59 percent), business (26 percent), or mathematics (25 percent). [Total equals more than 100 percent due to multiple majors.] Additionally, 20 percent had graduate degrees in computer science. Twenty-two percent of the C-shred officers had attended the Computer Systems Development course, E30BR5131B.

The computer-generated job description for C-shred survey respondents indicated substantial proportions of their job time was spent performing Software Development and Data Base Management tasks (23 percent and 18 percent, respectively). The task responses revealed no technical tasks performed by more than two-thirds of the C-shred respondents, yet each respondent performed an average of 115 tasks, showing that these officers performed a variety of jobs. The tasks which most clearly differentiate these respondents from other Computer Systems Development Officers were related to Data Base Management. Examples of these are listed below:

Advise programmers of proper use of data base systems
Modify or maintain data bases or data base formats
Identify data base deficiencies
Determine data base currency or accuracy
Determine data base requirements

Examination of C-shred officers' responses to the programming languages used indicated much the same usage as the previously discussed Systems Development shreds. Languages used by more than ten percent of the C-shred respondents are listed below:

FORTRAN - 41%
COBOL - 37%
JCL - 31%
Assembler - 24%
PL1 - 18%
BAL - 14%
CULPRIT - 14%
GMAP - 14%
Basic - 12%

A comparison of survey responses by C-shred personnel to the AFR 36-1 specialty description showed general agreement in the areas related to data base management. The specialty description does not mention the use of programming languages; something that should be considered for revision, due to the extensive use of a variety of programming languages by these officers.

d. Computer Systems Development Officer, Computer Mathematics Techniques - AFSC 5135D. There were 73 survey respondents with the D-shredout. The majority (97 percent) were company grade officers assigned to a variety of major commands. The largest concentrations were in AFSC (23 percent), SAC (20 percent), and at HQ USAF (13 percent). These respondents had an average of 20 months in the job and 76 months total service time. Their response to the educational background question showed that most had undergraduate majors in computer science (45 percent), mathematics (55 percent), or engineering (eight percent). (Total equals more than 100 percent, due to multiple majors.) An additional 20 percent held graduate degrees in computer science. From the computer systems courses listed in the job inventory, 25 percent had completed the Computer Systems Development course, 30BR5131B.

A review of the computer-generated job description for D-shred respondents showed the largest concentration of job time (47 percent) was taken up performing Systems Development tasks. The tasks performed by the largest proportion of D-shred respondents were the same tasks as those listed for A- and B-shred respondents. The tasks which most clearly illustrate the difference between the D-shred respondents and other Computer Systems Development Officers are listed below:

Define functions to be performed by individual programs or modules
Design data input or output formats
Analyze user software requirements
Coordinate with functional area experts to develop software
Provide technical advice to programmers

Examining the responses of D-shred officers to the programming languages listed in the job inventory again reflected the use of many of the same languages employed by AFSC 5135 survey respondents with the other shreds. Languages used by more than ten percent of D-shred respondents are listed below:

FORTRAN - 75%
Assembler - 30%
JCL - 27%
COBOL - 23%
PL1 - 22%
Basic - 19%

A comparison of survey responses by D-shred personnel to the AFR 36-1 specialty description showed agreement, with some exceptions in relation to use of programming languages and the specifics of mathematical and scientific applications. Officers with the D-shred perform a variety of systems analysis and development tasks with applications to broader functional areas than scientific and engineering systems.

e. Computer Systems Development Officer, Computer Performance Evaluation - AFSC 5135E. There were 45 respondents to the survey with a Performance Evaluation shredout. These respondents were primarily company grade officers (98 percent) assigned to AFCC (47 percent), SAC (11 percent), or AFSC (11 percent). They averaged 18 months in their current jobs and 95 months total active service. Their undergraduate areas of specialization were in computer science (58 percent), business (27 percent), mathematics (22 percent), and engineering (11 percent). [Total exceeds 100 percent due to multiple majors.] An additional 16 percent had completed graduate programs in computer science. From the list of computer systems courses in the job inventory, the Computer Systems Development course, E30BR5131B, had been completed by 27 percent of the E-shred respondents. In addition, 13 percent had completed the Computer Systems Analyst course (E30ZR5135B) and 11 percent had completed the Computer Operations Officer course (E30BR5151).

The computer-generated job description for respondents with a duty AFSC of 5135E indicated incumbents spent substantial amounts of their job time performing Software Development tasks (17 percent) and Systems Testing and Evaluation tasks (15 percent). Officers with the E-shred specialty tended to perform a variety of jobs and tasks, evidenced by the fact that no technical computer task was performed by as many as 55 percent of the E-shred respondents. The tasks which most clearly differentiate the functions performed by incumbents in the Performance Evaluation shred are

listed below (none of these tasks were performed by even 50 percent of the E-shred respondents):

- Prepare CPE or CPM performance analyses
- Develop test plans
- Analyze workload requirements
- Develop computer system sizing plans
- Build scenarios or determine scenario values for simulation

A review of the responses from E-shred incumbents to the programming languages listed in the job inventory revealed much the same pattern of responses as those provided by other Computer System Development officers. Listed below are those programming languages utilized by at least ten percent of the E-shred respondents:

- FORTRAN - 33%
- COBOL - 29%
- Basic - 22%
- BAL - 16%
- SIMSCRIPT - 16%
- Assembler - 15%
- JCL - 13%
- GMAP - 11%
- PL1 - 11%

Comparing the task performance data of E-shred officers with the AFR 36-1 specialty description showed general agreement with the areas specified. Tasks related to many of the Performance Evaluation functions, however, were performed by relatively small percentages of E-shred officers. Tasks which relate to acquisition, requirements, or systems engineering were done by less than 20 percent of those survey respondents with the E-shred.

In the job structure analysis section of this report, the job of Performance Evaluators was identified. The job group contained 21 officers who represented one percent of the survey sample. Of the 21 Performance Evaluators, 43 percent held the 5131E duty AFSC. That figure (43 percent) translates to only nine of the 45 respondents (or 20 percent) with the E-shred specialty performing the specific function for which the specialty was created.

Computer Systems Plans and Programs Officer - AFSC 5164. There were 174 respondents to the survey who had a duty AFSC of 5164. Most of these respondents were company grade officers (98 percent) who were assigned across all major commands. These officers averaged 19 months in their current jobs and slightly less than ten years total service time. Reviewing their educational background showed undergraduate majors in the areas of computer science (43 percent), business (28 percent), and mathematics (28 percent). Additionally, 18 percent had completed graduate

programs in business and 16 percent had completed graduate degrees in computer science. Twenty-four percent had completed the Staff Officer Course (E30AR5111), 13 percent had completed the Systems Development Officer Course (E30BR5131B), and 11 percent had completed the Operations Officer Course (E30BR5151).

An examination of the computer-generated job description for the Plans and Programs Officers revealed the largest proportions of their job time spent performing Acquisition and Contracting tasks (13 percent) and Personnel and Resource Management tasks (ten percent). The task responses showed a variety of jobs performed by officers with a duty AFSC of 5164. There were no technically related tasks performed by as many as 50 percent of these officers. The tasks selected by large percentages of respondents related to administrative functions. The tasks which illustrate the functions of Plans and Programs Officers are listed below (however, less than half of these respondents perform the listed tasks):

- Monitor progress of DARs, PARs, SDNs, or change proposals or requests
- Draft or write inputs to requirements documents, such as software modification requests, DARs, SONs, SDNs, SORs
- Determine computer hardware requirements
- Determine computer software requirements
- Draft or write inputs to program or project directives

Comparison of survey responses from Plans and Programs Officers with the AFR 36-1 specialty description indicated general agreement, with some reservations. The functions listed in the specialty description are performed by less than one-half of those respondents with a duty AFSC of 5164. The task responses for duty AFSC 5164 personnel reflect a more generalized assignment pattern. In the Job Structure Analysis section of this report, most Plans and Programs officers were in jobs in the Management cluster, the Acquisition and Contracting cluster, and the Staff Officer cluster (77 percent of respondents with a duty AFSC of 5164 were found in these clusters).

Computer Systems Staff Officer - AFSC 5116. The survey sample included 197 respondents with a Staff Officer duty AFSC. The majority of these officers were majors (43 percent), lieutenant colonels (28 percent), or captains (21 percent), assigned in all major commands. They averaged 20 months in their current jobs and slightly more than 16 years total service time. The Staff Officers performed an average of 108 tasks and reported direct supervision over five subordinates. Most had undergraduate degrees in business (30 percent), mathematics (42 percent), computer science (11 percent), or engineering (nine percent). Approximately percent had completed graduate degrees with specialization in business (36 percent), computer science (32 percent), or mathematics (eight percent). Among the computer systems courses listed in the job inventory, 38 percent had completed the Staff Officer course, E30AR5111.

Examining the computer-generated job description for the Staff Officers revealed that approximately one-half of their job time was taken up by General Functions (19 percent), Command and Management (18 percent), and Personnel and Resource Management (13 percent) tasks. Examining the task responses confirmed the managerial nature of the jobs these respondents perform. There was no technical computer-related task performed by as many as one-half of the Staff Officer respondents. The tasks listed below are examples of the type of jobs performed by personnel with a duty AFSC of 5116:

- Draft or write inputs to regulations, directives, or manuals
- Analyze workload requirements
- Plan or direct work assignments or workloads
- Counsel personnel on personal or military-related matters
- Formulate data automation policies

Comparison of survey responses for Staff Officer respondents with the AFR 36-1 specialty description indicated substantial agreement. The duties and responsibilities outlined in the specialty summary are an accurate reflection of the broad array of tasks performed by officers with a duty AFSC of 5116.

Computer Systems Manager - AFSC 5176. The survey sample included 170 respondents with a duty AFSC of 5176. The majority of these officers were majors (42 percent) or lieutenant colonels (37 percent) who were assigned across all major commands. These incumbents averaged 18 months in their current jobs and approximately 17 years total time in service. Computer Systems Managers performed an average of 138 tasks, had an average of six subordinates, and reported a managerial span of control of 44 personnel. Review of the educational backgrounds of these officers revealed that most had undergraduate degrees in mathematics (45 percent), business (21 percent), or computer science (nine percent). Additionally, 78 percent reported completion of a graduate program, with the majority specializing in business (33 percent), computer science (32 percent), or mathematics (seven percent). Review of the computer systems courses listed in the inventory indicated 37 percent had completed the Staff Officer course, E30AR5111.

A review of the computer-generated job description for the Computer Systems Managers indicated substantial proportions of job time spent performing Command and Management tasks, General Functions tasks, and Personnel and Resource Management tasks. The task responses reflected a supervisory and managerial job with relatively large percentages of personnel responding to the management-related tasks. The tasks listed below illustrate the jobs performed by these respondents:

- Draft or write Officer Effectiveness Reports (OER)
- Interpret policies, directives, or procedures for subordinates
- Assign personnel to duty positions or additional duties
- Approve or disapprove leave requests
- Prioritize ADP taskings or work requests

Comparison of the survey responses from the Computer Systems Managers to the AFR 36-1 specialty description revealed substantial agreement. The duties and responsibilities outlined in the classification summary are a reflection of the jobs and tasks performed by Computer Systems Managers.

Computer Systems Program Director - SDI 0960. The survey sample included 56 respondents with an SDI of 0960. Most were colonels (61 percent) or lieutenant colonels (34 percent) who were assigned across all major commands. The largest concentrations were assigned to SAC and AFCC, each with nine officers assigned. Incumbents with this SDI performed an average of 181 tasks (the largest average among all of the specialties and shreds in this survey), had an average of 20 months in their current jobs, and slightly more than 22 years total time in service. Program Directors reported supervising an average of nine subordinates and a managerial span of control over an average of 138 personnel. Review of the educational backgrounds of these respondents showed a variety of undergraduate areas of specialization, such as mathematics (29 percent), business (23 percent), engineering (18 percent), military science (16 percent), and education (14 percent). Approximately 80 percent had completed graduate programs with majors in business (30 percent), computer science (34 percent), or mathematics (nine percent). Of the computer systems courses listed in the job inventory, 16 percent of the program directors had completed the Staff Officer course (E30AR5111), 16 percent had completed the Systems Analyst course (E30ZR5135B), and 11 percent had completed the Operations Officer course (E30BR5151).

Examination of the computer-generated job description for Program Directors showed that substantial proportions of their job time was spent performing Command, Personnel, and Resource Management functions (41 percent of total job time). The tasks listed below illustrate the type of jobs performed by Program Directors:

- Establish unit goals or objectives
- Promulgate data automation policies
- Monitor use of personnel
- Establish organizational policies, office instructions, or standing operating procedures
- Approve or disapprove requirements documents, such as software modification requests, DARs, SONs, or SDNs

Comparison of survey responses of Program Directors to the AFR 36-1 specialty description indicated substantial agreement between what is expected of Program Directors and the jobs they actually performed.

Summary of the Specialty Analyses

Survey responses were examined within each of the Air Force specialties and shredouts which make up the Computer Systems Officer utilization field. Viewed as a whole, the utilization field appears to be divided into many ill-defined (in terms of actual job and tasks performed) specialties. For example, the Operations Officer specialty (AFSC 5155) seems to be a company grade officer version of the Systems Manager specialty (AFSC 5176). Members of both groups were involved in directing and managing computer facilities and performed a wide variety of supervisory functions.

As a second example, there are five shredouts of the Computer Systems Development Officer specialty. The survey data show that many of the respondents with a duty AFSC in the 5135 series perform many of the same tasks and utilize many of the same programming languages. The original intent for the Systems Development specialty shreds appears to have the field structure parallel the application of tasks performed and programming languages. The survey data, however, show clearly that the considerable commonality of tasks performed outweighs the difference in application. One possible conclusion is that there are too many shredouts to allow for meaningful personnel management and too few shredouts to define all of the differences that exist in the applications of system development expertise.

Analysis of responses by incumbents in the Plans and Programs specialty (AFSC 5164) and the Staff Officer specialty (AFSC 5116) revealed a wide variety of task performance. The responses covered such a broad range (few tasks related to technical data automation or data automation management) that the specific purpose for each of the specialties comes into question. For both of these specialties, the functions for which they were created exist, but the tasks related to these functions tend to be performed by personnel in all of the Computer Systems Officer specialties. For example, looking back to the Job Structure Analysis Section of this report, there was a Staff Officer cluster identified. However, 20 percent of the members of that cluster were Plans and Programs Officers (duty AFSC 5164). Additionally, the specialty descriptions for both Staff Officers (AFSC 5116) and the Plans and Programs Officers (AFSC 5164) include the responsibilities for acquisition of ADP resources and program formulation. Such duplication could be eliminated through consolidation of these specialties, possibly with the Systems Manager specialty.

Again, looking back to the Job Structure Analysis Section of the report, the job clusters representing Management, Acquisition and Contracting, and Staff Officers together account for the majority of the respondents in each of the following three specialties: 83 percent of the Staff Officers; 77 percent of the Plans and Programs Officers; and 82 percent of the Systems Managers. The jobs, tasks, and responsibilities appear to be those appropriate to staff level officers (senior captains through lieutenant colonels). The possibility for a single specialty with the responsibilities contained in the existing jobs and specialty descriptions warrants consideration. (Careful review of the present specialty descriptions shows that much of the consolidation of responsibilities is presently documented, in that the specialty description summaries say many of the same things.)

TRAINING ASSESSMENT

The objective of this section of the survey report is to compare entry-level training and the tasks actually performed by junior Computer Systems Officers. For an effective personnel management system, the entering individuals should possess the prerequisite knowledges to allow them to efficiently pass through the training pipeline and become effective performers on the job.

For the Computer Systems Officers, the entering population appears to have the prerequisite knowledge, as shown in Table 12.

TABLE 12
UNDERGRADUATE AREAS OF SPECIALIZATION FOR
COMPUTER SYSTEMS LIEUTENANTS

<u>AREA</u>	<u>PERCENT RESPONDING</u>
COMPUTER SCIENCE	59%
BUSINESS	25%
MATHEMATICS	19%
ENGINEERING	5%
ECONOMICS	3%
BIOLOGY	3%
EDUCATION	3%

* TOTAL EXCEEDS 100 PERCENT DUE TO RESPONDENTS WITH MULTIPLE MAJORS

For the entering Computer Systems Officers, there appear to be three options: (1) attend the Operations Officer course, (2) attend the Systems Development course, or (3) report directly to their initial assignment. In the sample of 1,016 lieutenants for this survey, 29 percent had completed the Systems Development Officer course and 3 percent had completed the Operations Officer course.

To determine the relevance of training to jobs performed, personnel from the Keesler Technical Training Center matched tasks from the AFS 51XX job inventory to the appropriate plan of instruction (POI) objectives for the two entry-level courses - Computer Operations Officer, 3OBR5151, and Computer Systems Development Officer, 3OBR5131B. Survey data, the training emphasis ratings, and the percentage of incumbents performing each task, were then combined with the appropriate POI objective. Review of this combination of information allows for an assessment of the relevance of training to the jobs performed.

The Computer Systems Operations Officer Course, 3OBR5151, is 6 weeks and 3 days in Computer and Data Processing, Computer Systems, Management Responsibilities, and Management Systems. The first block serves as a general introduction to computer and data automation. There were very few tasks matched to Block I objectives.

Block II serves as an introduction to current Air Force hardware and software. The bulk of the 64 hours are directed toward COBOL programming. The tasks referenced to these 40 hours in instruction received very low training emphasis ratings (all but one task were rated below the average training emphasis rating of 1.08) and were performed by less than 15 percent of all AFS 515X respondents.

Block III covers the management responsibilities for Operations Officers in such areas as data processing, personnel management, and security. The objectives in Block III were well supported in terms of training emphasis ratings and the percentage of personnel performing tasks referenced to the block.

Block IV presents information on a variety of data automation systems management areas, such as inquiry systems, performance measurement and evaluation, tape maintenance, and report submissions. Most of the material presented in Block IV was supported by training emphasis ratings and substantial percentages of respondents performed the tasks referenced to the Block IV objectives.

In addition to the tasks referenced to POI objectives, many tasks were not referenced to any POI objectives. There were, among these tasks not referenced, a substantial number with high training emphasis ratings and a much greater number performed by large percentages of AFS 515X respondents. These tasks not referenced should be reviewed with regard to potential for inclusion in the 3OBR5151 course.

The Computer Systems Development Officer Course, 3OBR5131B, is 13 weeks long and is divided into 8 blocks of instruction, listed below:

I	Orientation
II	Problem Solving
III	High Order Language (COBOL)
IV	Applied Systems Analysis & Design
V	Systems Software
VI	Representative Assembly Language Programming
VII	Data Base Systems Design
VIII	Software Systems Design & Course Project

All of the blocks of instruction, except Block IV, were well supported by training emphasis ratings and substantial percentages of lieutenants from each of the shreds performing tasks referenced to the POI objectives. The percentages performing those tasks were very similar across all the AFSC 513X shreds.

Block IV is 64 hours of training in Applied Systems Analysis and Design. There were no tasks from the AFS 51XX Job Inventory referenced to objectives in Block IV, so assessment of the relevance of the information was not possible.

Review of the tasks not referenced to any part of the 30BR5131B POI revealed substantial numbers of tasks with high training emphasis ratings and large percentages of personnel performing those tasks. Examination of the tasks not referenced might lead to new areas for inclusion in the training program.

In addition to reviewing the two entry-level courses, training emphasis ratings were collected from a senior group of raters (majors and lieutenant colonels) for use in examining the proposed Staff Officer Course, 30AR5111. The proposed course has three blocks of instruction--Life Cycle Management, Supporting ADP Disciplines, and Staff Officer Perspective--included in the five-week, two-day, duration.

Block I is a relatively long (98 hours) accumulation of a variety of managerial concerns, i.e., organizational structure, regulatory structures, PPBS, manpower and personnel. The majority of subject areas covered in Block I appear to relate to tasks performed by Staff Officers and Systems Managers. The objectives related to driver training, the role of a staff officer and staff studies might be examined concerning relevance to the jobs and tasks performed or appropriateness for resident training versus local training or PME.

Block II encompasses 80 hours of instruction including a variety of support areas, economics, software management, data base management, acquisition, communications, and security. The subject areas of economics, software management, and acquisition were well supported by training emphasis ratings and task performance data. The remaining subject areas could be reviewed to assess the relevance of specific technical information to the jobs performed by staff officers and systems managers.

The third block of the Staff Officer course is 38 hours related to the Staff Officer perspective. This block is primarily oriented toward the results from student case studies and project briefings. There were no tasks referenced to this block.

Review of the tasks not referenced to any POI objective for the proposed 30AR511 course indicated a need to include some training in the software management area. There were a variety of software development tasks with higher than average training emphasis ratings and many were performed by relatively large percentages of Staff Officer and Systems Manager respondents.

Summary of Training Assessment

The comparison of POI objectives to occupational survey data (training emphasis ratings and percent of respondents performing) indicated courses are, in general, covering appropriate material with some areas that warrant

examination. Any modification of the entry-level courses, Operations Officer (3OBR5151) and Systems Development Officer (3OBR5151B), should be accomplished with awareness of two factors: (1) the educational background of the students; and (2) the jobs course graduates will be expected to perform. In the former instance, educational background will most likely prepare personnel for the technical data automation tasks, such as systems analysis, software development, and systems design. However, it is extremely unlikely that personnel will be prepared for management responsibilities (both personnel and systems) which tend to be the basic area of work for many entry level officers.

Assessment of the proposed Staff Officer course indicated need for review in many of the technical ADP blocks of instruction. Most of the jobs performed by those who attend the Staff Officer course are in the areas of Management or Acquisition and Contracting. The proposed course provides approximately 11 hours of instruction out of a total of 216 hours on Acquisition. Survey findings suggest expansion in this area may be appropriate.

BACKGROUND INFORMATION

The purpose of this section is to present data on selected items of background information across the AFS 51XX specialties. The information contained in the following tables is generally self-explanatory, however, some trends and observations will be noted.

Evaluation of responses to the indicators of job satisfaction across the specialties showed generally high levels of job interest and perceived utilization of training. Additionally, responses to the career field plans question revealed substantial percentages of all respondents intend to remain in the Computer Systems Officer utilization field.

Review of the perceptions respondents conveyed about specific issues indicated that many feel a Master's degree would be beneficial in their present jobs. Additionally, the general perception of survey respondents was that instructor duty at Keesler TTC is undesirable.

There were questions in the background information specifically aimed at the Systems Development specialties. The use of many of the same programming languages and support of substantially the same functional applications suggests a high degree of overlap among the Systems Development shredots. Additionally, for those Systems Development officers who perform programming jobs and tasks, the majority employ Top Down Structured Programming Procedures.

TABLE 13
DAFSC DISTRIBUTION OF SURVEY RESPONDENTS BY MAJOR COMMAND

	PERCENT OF DAFSC GROUP								
	513X					0960			
	A	B	C	D	E	515X	516X	511X	512X
SAC	18	23	31	21	11	23	18	6	15
AFSC	17	16	2	23	11	7	4	14	4
AFC	21	10	8	10	47	4	16	13	12
TAC	11	13	4	3	7	13	16	1	16
MAC	6	5	4	3	6	19	5	4	6
ATC	5	6	16	6	9	12	5	2	6
USAFE*	5	6	8	3	0	11	7	5	6
PACAF**	8	6	4	3	2	2	4	4	2
ESC	2	2	0	4	0	1	3	1	1
AFLC	2	1	2	0	2	0	2	3	4
OTHERS	5	12	21	24	5	8	20	47	33

* INCLUDES EUCOM AND EUDAC
** INCLUDES PACOM

TABLE 14

ORGANIZATIONAL LEVEL OF PRESENT JOBS

	513X					PERCENT OF DAFSC GROUP				
	A	B	C	D	E	515X	516X	511X	517X	0960
DETACHMENT, FLIGHT OR OL	10	8	4	4	7	4	1	1	4	2
SQUADRON	13	11	6	15	4	15	4	3	2	0
GROUP	5	6	10	3	4	11	1	2	3	2
WING	8	6	0	1	4	30	3	1	8	2
AIR DIVISION	5	4	0	7	9	4	1	1	2	7
NUMBERED AIR FORCE	5	5	4	7	2	6	3	12	7	4
MAJOR COMMAND	30	39	53	22	47	16	62	31	44	46
JOINT SERVICE	6	7	12	7	2	3	11	19	13	18
DOD OR HQ USAF	13	11	10	26	4	2	10	23	13	14
OTHERS	5	3	1	8	17	9	4	6	4	5

TABLE 15
JOB INTEREST

	PERCENT OF DAFSC GROUP RESPONDING									
	<u>513X</u>					<u>515X</u>	<u>516X</u>	<u>511X</u>	<u>517X</u>	<u>0960</u>
	A	B	C	D	E					
INTERESTING	84	81	88	90	71	84	85	86	85	95
NEUTRAL	11	9	8	4	11	8	9	8	8	3
DULL	5	10	4	6	18	8	6	6	7	2

TABLE 16
JOB UTILIZES TRAINING

	PERCENT OF DAFSC GROUP RESPONDING									
	<u>513X</u>					<u>515X</u>	<u>516X</u>	<u>511X</u>	<u>517X</u>	<u>0960</u>
	A	B	C	D	E					
FAIRLY WELL OR BETTER	75	74	82	77	64	76	61	72	84	94
VERY LITTLE OR NOT AT ALL	25	26	18	23	36	24	39	28	16	6

TABLE 17
MASTER'S DEGREE BENEFICIAL IN PRESENT JOB

	PERCENT OF DAFSC GROUP RESPONDING									
	<u>513X</u>					<u>515X</u>	<u>516X</u>	<u>511X</u>	<u>517X</u>	<u>0960</u>
	A	B	C	D	E					
YES	48	46	61	53	60	35	47	67	70	91
NO	37	38	33	31	29	41	39	23	23	7
UNSURE	15	16	6	16	11	24	14	10	7	2

TABLE 18
PERCEPTION OF INSTRUCTOR DUTY AT KEESLER TTC

	PERCENT OF DAFSC GROUP RESPONDING									
	<u>513X</u>					<u>515X</u>	<u>516X</u>	<u>511X</u>	<u>517X</u>	<u>0960</u>
	A	B	C	D	E					
FAVORABLE	14	14	8	14	23	22	10	12	13	11
NEUTRAL	32	39	29	33	24	39	32	32	26	48
UNFAVORABLE	54	47	63	53	53	39	58	56	61	41

TABLE 19
CAREER FIELD PLANS

	PERCENT OF DAFSC GROUP RESPONDING									
	513X					<u>515X</u>	<u>516X</u>	<u>511X</u>	<u>517X</u>	
	A	B	C	D	E					
STAY IN 51XX	49	48	53	41	49	54	58	77	87	
CROSS TRAIN AND RETURN	7	6	6	4	11	2	4	3	4	
CROSS TRAIN OUT	20	22	12	30	29	26	26	7	5	
UNDECIDED	10	13	8	15	7	6	2	4	2	
SEPARATE	12	9	16	7	2	4	1	1	1	
OTHER	2	2	5	3	2	8	9	8	1	

TABLE 20
PROGRAMMING LANGUAGES USED

	PERCENT OF DAFSC GROUP RESPONDING				
	<u>513XA</u>	<u>513XB</u>	<u>513XC</u>	<u>513XD</u>	<u>513XE</u>
FORTRAN	45	39	41	75	33
ASSEMBLER	40	26	24	30	16
COBOL	32	39	57	23	29
JCL	26	24	31	27	13
BASIC	18	13	12	19	22
GMAP	16	9	14	7	11
PL1	14	15	18	22	11
JOVIAL	9	12	8	7	0
BAL	8	6	14	7	16
CULPRIT	1	3	14	1	2

TABLE 21
USE TOP DOWN STRUCTURED PROGRAMMING
PROCEDURES BY 513XX OFFICERS

	PERCENT OF DAFSC GROUP RESPONDING				
	<u>513XA</u>	<u>513XB</u>	<u>513XC</u>	<u>513XD</u>	<u>513XE</u>
YES	50	58	57	73	36
NO	15	12	8	11	11
DO NOT PROGRAM	34	30	35	14	53
NOT SURE	1	--	--	2	

TABLE 22
FUNCTIONAL APPLICATIONS SUPPORTED
BY 513XX OFFICERS

	PERCENT RESPONDING				
	513XA	513XB	513XC	513XD	513XE
ACCOUNTING AND FINANCE	14	8	6	10	11
AIR DEFENSE	10	14	14	11	16
AIR TRAFFIC CONTROL	4	3	0	4	2
ARMAMENT SYSTEMS	6	5	14	8	4
AUTOMATIC TEST EQUIPMENT	6	4	2	3	11
AVIONIC SYSTEMS	7	5	10	7	11
CIVIL ENGINEERING	6	2	2	3	7
COMMAND AND CONTROL	39	29	43	15	29
COMMUNICATIONS	28	20	20	12	33
ELECTRONIC WARFARE	9	10	14	8	0
HOSPITAL OR MEDICAL SERVICES	6	3	6	3	7
INTELLIGENCE	30	19	35	16	16
LOGISTICS	18	11	10	11	20
MANPOWER	16	10	14	7	11
MISSION SUPPORT	27	28	47	15	47
OFFICE MANAGEMENT	12	10	14	7	7
PERSONNEL	10	7	18	7	13
RECONNAISSANCE SYSTEMS	10	7	16	10	7
SPACE OPERATIONS	11	15	12	15	11
STRATEGIC OPERATIONS	14	16	25	16	13
TACTICAL OPERATIONS	15	14	18	16	16
TRAINING	17	17	33	11	16

SUMMARY

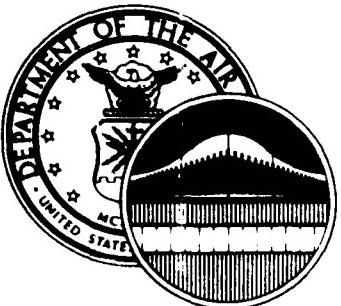
Analysis of occupational survey data from Computer Systems Officers resulted in descriptions of a variety of jobs performed by incumbents. The present classification structure designed in 1970 and modified in 1978 does not parallel job performance.

The job structure analysis identified a number of different jobs, many of which cross existing specialty descriptions. The variety of jobs may be grouped together to form a number of broadly defined functions - systems analysis management, acquisition and contracting, staff actions, and training. A number of smaller, more specific jobs were also identified - maintenance monitors, performance evaluators, facilities monitors, test and evaluation officers, software configuration controllers, telecommunications software monitors, contract evaluators, security managers and data base administrators. None of the jobs identified was performed by personnel from only one of the Computer Systems Officer specialties.

For the primary entry level specialties, DAFSCs 513XB and 515X, there was a relatively close relationship between the specialty description contained in AFR 36-1 and the training documentation. For the Systems Development Officer Course, 30BR5131B, training appears to be supported by training emphasis ratings and the tasks performed by new graduates. For the Computer Operations Officer Course, 30BR5151, survey data reflect the need for some modifications to the training.

There was general satisfaction by survey respondents with their jobs and the utilization of their training. Career field plans of the officers surveyed were generally positive, with substantial percentages in all specialties planning to remain in the Computer Systems Officer utilization field. Review of a number of background information items revealed one area of concern; namely, the negative perception of most Computer Systems Officers concerning instructor duty.

The primary conclusion drawn from this occupational survey is the need to modify the present classification structure to more accurately reflect the jobs officers perform, and then fine tune the training system to support those jobs or anticipated new jobs. No classification structure or training system can efficiently provide for all of the jobs and tasks performed by all Computer Systems Officers. Provisions for relevant and timely OJT and follow-on training are crucial factors to assure that Computer Systems Officers are prepared to perform their jobs and tasks.



UNITED STATES AIR FORCE

OCCUPATIONAL SURVEY REPORT



EXECUTIVE SUMMARY
COMPUTER SYSTEMS OFFICER UTILIZATION FIELD
AFSs 51XX

JUNE 1983

OCCUPATIONAL ANALYSIS PROGRAM
USAF OCCUPATIONAL MEASUREMENT CENTER
AIR TRAINING COMMAND
RANDOLPH AFB, TEXAS 78150

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EXECUTIVE SUMMARY

Introduction

The occupational survey of the Computer Systems Officers utilization field was initiated by the ATC Deputy Chief of Staff for Technical Training with the concurrence and support of the USAF Director of Data Automation. The purpose of the survey was to describe the jobs and tasks performed by Computer Systems Officers. The findings provide information that may be used for classification and training decisions. This paper is a summary of the methodology, findings, and implications of the occupational survey.

Methodology

A detailed job inventory, consisting of 1,105 tasks and 30 background questions, was developed from interviews with 600 Computer Systems Officers at 22 locations. The job inventories were mailed to 2,655 Computer Systems Officers in August 1982. Each survey recipient was asked to answer the background questions, indicate the tasks that he or she performed, and rate the relative amount of time spent on the tasks performed. Data collection was terminated in December 1982, after 77 percent of the officers had returned job inventories. Data analysis was accomplished using the comprehensive occupational data analysis program (CODAP) package. CODAP allows the identification of jobs performed by utilization field members and the data were analyzed in terms of the job description and background information for personnel in each type of job.

Findings and Implications

The jobs performed by Computer Systems Officers, both across and within specialties, represented a variety of data automation functions--systems analysis, management, acquisition and contracting, staff actions, training, contract and performance evaluation, monitors of maintenance, facilities and telecommunications software, security management, software configuration control, and data base administration. The present classification structure does not completely parallel the jobs performed.

For entry-level specialties, duty AFSCs 515X and 513XB, there was a close relationship between classification and training documentation and general agreement between training and the jobs performed. However, the variety of jobs which exist in the Systems Development Specialty (AFSCs 513XA/B/C/D/E) tended to be nearly as great as the variety of jobs across the entire utilization field. Additionally, the acquisition and contracting jobs were not completely covered by either the classification or training documents.

The majority of Computer Systems Officers surveyed reported their jobs were interesting and utilized their training at least fairly well. Substantial percentages of respondents from all specialties at all grades reported: working with contractors; receiving no on-the-job training for their jobs; not attending any entry-level training; and negative perceptions of instructor duty at Keesler TTC.

